UNITED STATES DISTRICT COURT
DISTRICT OF MASSACHUSETTS

ASTELLAS INSTITUTE FOR REGENERATIVE MEDICINE, Plaintiffs, v. IMSTEM BIOTECHNOLOGY, INC., XIAOFANG WANG, and REN-HE XU, Defendants.	C.A. No. 1:17-cv-12239

DEFENDANTS' PRETRIAL MEMORANDUM

TABLE OF CONTENTS

I. DEFENDANTS' CONCISE SUMMARY OF THE EVIDENCE 1
- A. Basic Science 1
- B. The Initial Recipe 2
- C. Wang and Xu's First Patentable Contribution: Treating Multiple Sclerosis 2
- D. Wang and Xu's Further Patentable Contributions: Improving the Recipe 3
- E. The Fraying of the Collaboration 5
- F. The Parties' Competing Patent Applications 5
- G. The Parties' Discovery of Each Other's Patent Applications 7
- H. The Prosecution History and GSK3i 8
- I. Astellas Delays Filing Suit 9
- J. Astellas Suffered No Harm 9

II. FACTS ESTABLISHED BY THE PLEADINGS, ADMISSION, OR STIPULATION . 10

III. CONTESTED ISSUES OF FACT 10

IV. JURISDICTIONAL QUESTIONS 11

V. QUESTIONS RAISED BY PENDING MOTIONS 11

VI. ISSUES OF LAW, INCLUDING EVIDENTIARY ISSUES 11
- A. Procedural Background 11
- B. Issues of Law 12
- C. Evidentiary Issues 14

VII. REQUESTED AMENDMENTS TO THE PLEADINGS 15

VIII. ADDITIONAL MATTERS TO AID IN THE DISPOSITION OF THE CASE 15
- A. The Parties' Stipulations Regarding Trial Proceedings 15
- B. Advance Exchange of Demonstratives 15
- C. Handling of Exhibits During Examinations 16
- D. Time Zone Accommodation 16

IX. WITNESSES AND PROBABLE LENGTH OF TRIAL 17

X. PROPOSED EXHIBITS 20

Pursuant to the Court's Pretrial Order (ECF 210), Defendants ImStem Biotechnology, Inc. ("ImStem"), Dr. Renhe Xu, and Dr. Xiaofang Wang (collectively "Defendants") submit the following Pretrial Memorandum.[1]

I. DEFENDANTS' CONCISE SUMMARY OF THE EVIDENCE

This lawsuit arises from a once-amicable collaboration – between two Plaintiff scientists (Kimbrel and Lanza) and two Defendant scientists (Wang and Xu) – concerning protocols for making, and methods of using, human mesenchymal stem cells ("MSCs").[2]

A. Basic Science

In nature, when an egg is fertilized by a sperm, the fertilized egg begins a process of division. The first cell splits into two cells, two become four, four become eight, and so on. At some point, these first "undifferentiated" (*i.e.* functionally identical) human embryonic stem cells ("hESCs") begin to differentiate; *i.e.* to express different genes and distinguish themselves into cell lineages that will eventually give rise to the full range of cells in the human body: bone, cartilage, nerves, skin, blood cells, organs, and tissues of all sorts. Scientists have for years studied the mechanisms of early cell differentiation. It is complicated. Much of it remains a mystery.

MSCs are quasi-differentiated cells that have the ability to become a wide range of bodily cells, such as bone, fat, and cartilage. While less pluripotent than precursor hESCs, they retain the ability to change and develop into a wide range of cell types. MSCs occur in nature but are

[1] Defendants are simultaneously submitting a Trial Memorandum Including Proposed Findings of Fact and Conclusions of Law.

[2] MSC's are semi-differentiated cells that have the ability to become a wide range of bodily cell types, such as bone, fat, and cartilage. While partially differentiated from (and thus less pluripotent than) human embryonic stem cells ("hESC'"), they retain the ability to develop into a wide range of cells. *See, e.g.*, Defendants' Statement of Undisputed Material Facts ("SMF") ¶ 1; Amended Complaint ¶ 29-30.

difficult to isolate. Scientists have reproduced them in the laboratory but the exact mechanisms of MSC formation and differentiation are still, today, not fully understood.

B. The Initial Recipe

In late 2009, three Astellas employees (Erin Kimbrel, Robert Lanza, and Shi-Jiang Lu) developed a protocol – essentially a recipe – for making a new kind of MSC-like cell. The protocol was built upon an earlier paper that Drs. Lu and Lanza had published in which they described starting with hESCs and differentiating them (using chemical stimulants) into embryoid bodies, then differentiating the embryoid bodies into cells called hemangioblasts. Lu, Kimbrel, and Lanza conceived of adding a fourth step to the recipe: further differentiating the hemangioblasts into MSCs, resulting in so-called "hemangioblast-derived MSCs" or "HB-MSCs."[3]

They did so *in vitro* and obtained cells that looked like MSCs. Critically, however: (i) Lu, Lanza, and Kimbrel did not know whether the cells were true MSCs because they had no means of testing whether the cells would differentiate properly *in vivo*, and (ii) they had not yet fully conceived of therapeutic uses of the cells. Kimbrel and Lanza were bench scientists, not clinicians. They froze the cells and put them in storage.

C. Wang and Xu's First Patentable Contribution: Treating Multiple Sclerosis

In the Spring of 2010, Lu encountered his friend Dr. Renhe Xu and his post-doc (Dr. Xiaofang Wang) at a conference. Xu was the Director of the University of Connecticut Stem Cell Institute and a highly acclaimed scientist who had devoted his career to advancing stem cell research and therapeutic uses. He and Wang had recently written a book chapter on using MSCs

[3] Many scientific teams were creating many protocols at this time, and studying the resulting cells, as means of exploring early stem cell differentiation. A team led by Dr. Slukvin at the University of Wisconsin had already differentiated HBs into MSCs by a different name. There was therefore little new in the Lu/Lanza/Kimbrel protocol.

to treat MS. Lu mentioned his team's new MSC-like cells.[4] Wang took an immediate interest and, in a follow-up meeting two weeks later, suggested not only a way of testing the cells in mice *in vivo* but also suggested that the cells might be effective in treating multiple sclerosis ("MS"), Wang's area of expertise.

Over the next several weeks, Wang and Xu met with Kimbrel, obtained some samples of the purported "MSCs," designed a testing protocol for mice that had been genetically modified to mimic MS, and worked with a contracting laboratory to test the cells (before eventually testing themselves). Wang and Xu started sharing the ideas and results with Kimbrel and Lanza. The parties were in regular contact. By late 2010, the experiments had started yielding favorable results.

D. Wang and Xu's Further Patentable Contributions: Improving the Recipe

As the experiments continued, the parties agreed that Wang should make the HB-MSCs himself, in-house, using the four-step protocol that Kimbrel had given him.

Wang quickly noticed the yield was poor. The raw Lu/Lanza/Kimbrel protocol produced failed batches, poor-quality EBs, poor-quality HBs, and few final cells. He and Xu realized the protocol would never work at scale in any sort of clinical setting. Wang and Xu therefore set about improving the recipe in order to advance the collaboration.

First, drawing upon their prior experience with serum-free and feeder-free[5] cell cultures, Wang and Xu came up with the idea of adding a new chemical, "GSK3 inhibitor" ("GSK3i"), at a specific concentration to the initial culturing medium in which the hESCs were grown,

[4] Lu and Kimbrel worked at Stem Cell Regenerative Medicine Institute ("SCRMI"), which was a joint venture between Advanced Cell Technologies, Inc. ("ACT") and a South Korean company. Lanza was employed by ACT but oversaw Kimbrel's work at the SCRMI joint venture. ACT was later acquired by Ocata Pharmaceuticals and then Astellas, which later also acquired SCRMI. For purposes of the instant summary, we use the terms ACT, Astellas, and Plaintiff interchangeably.

[5] Cells are grown in a "growth medium," typically a nutrient-rich gelatin on petri dishes. Serum-free medium does not contain bovine blood serum, a common ingredient. Feeder-free connotes the lack of co-located "feeder" cells.

essentially adding a new, precursor step to the protocol. GSK3i had never been deployed in this kind of four-step recipe and it created unexpectedly positive results in the later steps. By adding GSK3i to the cells before undertaking the first step, the revised protocol yielded better, more defined and tightly-ordered clusters of cells in the second (EB) step, and greater yield in the third (HB) and fourth (MSC) steps. Wang and Xu's use of GSK3i improved both quality and quantity, critical for use in a real-world clinical setting. Put simply, GSK3i had surprisingly beneficial downstream consequences.

Second, drawing upon their experience as MDs, Wang and Xu conceived of the idea of "mitotically inactivating" the HB-MSCs after they had been formed – essentially adding a fifth step to the protocol. Wang and Xu's insight was that the MSCs might have therapeutic use even if the MSCs were effectively sterilized and unable to subdivide (the ordinary behavior of MSCs) because they would nevertheless continue to secrete beneficial cytokines during their lifespan. Wang had conceived of the general idea before meeting Kimbrel and Lanza and decided that this recipe might be improved by it, by preventing the cells from turning into tumors when injected into patients. (Years later, Astellas's own expert Dr. Brivanlou would call this "novel" and an "innovation – an invention.")

Third, after much thought and experimentation, Wang and Xu conceived of the idea of screening the cells created by the fourth step of the recipe (MSCs) based on measurements of the chemicals they secreted. In particular, Wang and Xu hypothesized that cells that secreted very low levels of IL-6 would be better for therapeutic use, and that manufacturers should screen for and preferentially use such cells. This idea likewise reflected Wang and Xu's expertise in MS and their background in real-world therapies, since low IL-6 expression would be beneficial for some conditions (*e.g.* MS) even if harmful for others.

Fourth, Wang and Xu conceived of the idea of comparing the cells created in the fourth step to a reference MSC created using another, older recipe (so-called bone-marrow-derived MSCs or "BM-MSCs"). While more modest than their other contributions, the concept of comparing these new cells to BM-MSCs (as opposed to other cell types) was bound up in their uncommonly deep understanding of immune system regulation and MS.

In sum, Wang and Xu added a precursor step at the front end of the original Kimbrel/Lanza/Lu protocol and several steps at the back end – producing cells that were more numerous, more robust, and better adapted to transition from the laboratory to real-world clinical trials and use, making the process more commercially viable. Wang and Xu's improvements were unexpected, substantial, and meaningful, the product of insight, experience, and hard work.

By late 2011, Wang and Xu had substantially improved the protocol. They continued to run experiments, investigate the underlying science, work hundreds of (unpaid) hours, and obtain grants to fund the collaboration. They shared their data and improvements with Kimbrel and Lanza – not realizing that Kimbrel and Lanza would incorporate their data and process improvements into a patent application without crediting them.

E. The Fraying of the Collaboration

In 2011, ACT and Lanza took control of SCRMI and Kimbrel and began trying to impose new limitations on the collaboration, including confidentiality obligations that were more aggressive than the parties had originally contemplated. Wang and Xu declined to engage the details of Kimbrel and Lanza's emails – and never accepted or signed a formal agreement. Relations deteriorated further in June 2012 when Lanza "accidentally" published some of the collaboration results at a conference in London.

F. The Parties' Competing Patent Applications

Relations were so frosty that the parties did not inform each other of their respective

patent applications (prosecuted in parallel, unbeknownst to each other, with Astellas enjoying a seven-month head start).

On November 30, 2011, Kimbrel and Lanza filed a provisional patent application (which would mature into the '321 and '956 patents) that included not only the original Kimbrel/Lanza/Lu protocol, but also (i) Wang and Xu's concept of using the resulting cells to treat MS, the only autoimmune disease listed and the only disease of any kind with data in the specification (also poached from Wang and Xu); (ii) Wang and Xu's concept of mitotic inactivation – including a verbatim copy of Wang's original explanation previously drafted for a collaboration grant proposal; (iii) Wang and Xu's concept of IL-6 screening; and (iv) Wang and Xu's concept of BM-MSC comparison. Kimbrel and Lanza did not name Wang and Xu as co-inventors, instead separately claiming the foregoing inventions as their own.

Put simply, even though Drs. Xu and Wang's work provided a significant component of the revised/improved protocol that was the subject of the '321 and '956 patents, Lanza failed to recognize their contributions when he applied for the '321 patent – instead taking credit for himself and Dr. Kimbrel.[6]

On July 12, 2012 – not knowing that Kimbrel and Lanza had already claimed Wang and Xu's improvements as their own – Wang and Xu filed their own provisional patent application. They did not name any co-inventors.[7] On June 27, 2013, they filed a revised non-provisional version of their application.[8] All of these applications remained non-public (except to the PTO,

[6] Lanza and Kimbrel did include two other persons – low-level team members who had done far less than Drs. Xu and Wang but Astellas employees. *I.e.* Astellas could keep exclusive ownership via employee assignment.

[7] Wang drafted the application himself, without a lawyer. The Court has since determined that Wang and Xu should have named Kimbrel and Lanza as co-inventors.

[8] PCT/US2013/04829 ("'551 PCT application"). The '551 PCT application was substantially revised from the provisional. Wang had discovered the Kimbrel/Lanza application since filing the original provisional, and substantially re-wrote the new '551 PCT application, this time with the assistance of counsel.

which in any event had already seen the Lu/Lanza/Kimbrel recipe in the '321 patent application).

In parallel with their work with Astellas and their filing the '551 patent application, Wang and Xu were also developing a different technology: a three-step protocol for deriving MSCs from trophoblasts, not hemangioblast (so-called "T-MSCs") based on Xu's pre-collaboration research. T-MSCs were easier and cheaper to produce, appeared effective at treating MS, and were more commercially viable than HB-MSCs. Wang and Xu began filing and seeking patents on their T-MSC technology as well.

In June 2012, Wang and Xu formed a company dedicated to exploiting the new T-MSC technology. Earlier drafts of their business plan included broad language that referenced the HB-MSC protocol in concept, but later versions were narrowed to indicate that T-MSCs were the true focus of ImStem's business model.[9]

In May 2013, Astellas learned that Wang and Xu had formed ImStem and that ImStem was directed to the development of MSCs to treat multiple sclerosis. Kimbrel emailed her colleague at ACT to "keep an eye" on ImStem.

G. The Parties' Discovery of Each Other's Patent Applications

The parties soon discovered each other's dueling patent applications. In February 2014, Astellas spotted Wang and Xu's '551 PCT application and immediately circulated it among senior management.[10] Astellas' leadership quickly concluded they had a legal claim and by June

[9] In addition to submitting competing patent applications, the parties also had a spat concerning academic papers. In a nutshell, the parties had originally planned to jointly publish two papers: (1) a paper concerning the protocol and *in vitro* lab work; and (2) a paper concerning *in vivo* mouse results. At the last minute, Kimbrel and Lanza demanded that the *in vivo* data be included in the first paper, with themselves as lead authors. Wang and Xu balked. Kimbrel and Lanza secretly hired a private laboratory, reproduced some data, and "scooped" the second paper by publishing an article in a prestigious scientific journal without including or crediting Wang and Xu.

[10] On January 16, 2014, the '551 PCT application published as WO2014/011407, in keeping with standard World Intellectual Property Office practice. The '551 PCT application was then domesticated in the U.S. PTO as a national stage ("non-provisional") application under 35 U.S.C. § 371 and assigned U.S. Patent Application No. 14/413,290 on January 7, 2015 (the '551 Non-Provisional Application), ultimately issuing as the '551 Patent. Simply put, the '551 PCT application is substantively identical to the '551 Non-Provisional Application, and thus the '551 Patent.

were discussing "mak[ing] a case for why Erin [Kimbrel] should have been included as a co-inventor, and why ACT would be a co-owner of that patent." By mid-2014 the Plaintiff knew that Wang and Xu had formed ImStem. They knew that ImStem was operating in "their" field. They knew that Wang and Xu had filed a patent application on "their" protocol. They knew the contents of the application. They knew that "Erin should have been included as a co-inventor." *Id.* They nonetheless waited.

H. The Prosecution History and GSK3i

The parties (and the PTO) also figured out that they had submitted substantially similar applications. On January 17, 2017, the Defendants voluntarily disclosed the Astellas application to the PTO. The Examiner – upon comparing the two applications – determined that the claims were substantively identical.[11] In a non-final Office Action mailed on July 28, 2016 the PTO rejected the Defendants' claims as anticipated by Astellas' application.

The Defendants therefore amended their claims to affirmatively require one of their improvements, the step of culturing hESCs in a serum-free medium "with at least one GSK3 inhibitor at a concentration ranging from 0.05 uM to 0.2 uM, wherein the hESCs are cultured in the absence of feeder cells." The Defendants argued to the PTO that Astellas' application did not mention GSK3 inhibitor, and that their amended claim (with GSK3i) was thus novel and non-obvious.[12]

The Examiner agreed. In his Reasons for Allowance, the Examiner stated that the claims were allowable because "the claims now require the presence of a GSK3 inhibitor at a specific concentration that results in the production of hES-MSCs with the specific characteristics recited

[11] At that point, the Defendants' claim 1 had recited the *optional* step of culturing hESCs with a GSK3 inhibitor. It was not yet a true limitation.

[12] Kimbrel and Lanza have both admitted that they did not conceive of the GSK3i step in the '551 patent, nor did their recipe (or later work) include it.

by the claims." According to the Examiner, the addition of GSK3i – a Wang and Xu improvement – was novel and non-obvious.[13]

I. Astellas Delays Filing Suit

More than four years after "keeping an eye" on their new competitor, three-and-a-half years after reviewing the '551 PCT Application and concluding it might cause "litigation," and more than three years after internally articulating their legal rights, Astellas finally filed suit.

J. Astellas Suffered No Harm

Astellas lack of urgency reflected its lack of harm. Aside from causing a few bruised egos, Wang and Xu's failure to name Kimbrel and Lanza on the '551 patent had cost Astellas nothing. The underlying Lu/Kimbrel/Lanza protocol – the one Wang and Xu allegedly incorporated into their patent application – was already public by the time Wang and Xu filed their '551 PCT application. Nothing was "disclosed" to the public.

Furthermore, no one had licensed or commercialized the technology. (Wang and Xu's T-MSC technology, meanwhile, was taking off – embarrassing and threatening Astellas). Astellas had suffered no harm. It lost no customers, no business opportunities, and has alleged none.

Nor could Astellas lay claim to ImStem's capital or alleged market value as a company. Even if Wang and Xu had disclosed the original protocol to their investors (they did not) and the investors had understood it (they did not) and made their investments because of it (they did not), the parties would never have settled for more than a nominal amount; ImStem could not and would not pay for the right to use the original, inefficient, commercially doomed protocol – having both improved the protocol and having then moved on to another technology altogether.

[13] Wang and Xu also filed a declaration under 37 C.F.R. § 1.131 "swearing behind" the Lanza and Kimbrel application, but the declaration was mooted by the Examiner's determination that the use of GSK3i was novel and non-obvious. It is not evident from the record that the Examiner considered or reviewed the declaration.

II. FACTS ESTABLISHED BY THE PLEADINGS, ADMISSION, OR STIPULATION

The parties' joint Facts Established by the Parties' Stipulation is attached as Exhibit A.

III. CONTESTED ISSUES OF FACT

1. Whether Defendants Wang and Xu made not-insubstantial, non-obvious contributions to the '551 patent, including but not limited to the use of GSK3i.

2. Whether Defendants Wang and Xu made not-insubstantial, non-obvious contributions to the '321 patent, including but not limited to; (ii) Wang and Xu's concept of mitotic inactivation – including a verbatim copy of Wang's original explanation previously drafted for a collaboration grant proposal; (iii) Wang and Xu's concept of IL-6 screening; and (iv) Wang and Xu's concept of BM-MSC comparison.

3. Whether Defendant Wang made not-insubstantial, non-obvious contributions to the '956 patent, including but not limited to (i) Wang and Xu's concept of using the resulting cells to treat MS, the only autoimmune disease listed and the only disease of any kind with data in the specification (also poached from Wang and Xu).[14]

4. Whether the '551 PCT Application – which was indisputably seen by Astellas[15] at least by February 4, 2014 and shared with Astellas' counsel – disclosed the contents of the '551 Patent such that Astellas was on notice of its claims for Conversion, Unfair Trade Practices, and Unjust Enrichment.

[14] Defendant Xu is currently precluded from seeking to join the '956 patent by operation of the Court's ruling on the Defendants' Motion to Amend the Complaint (ECF 085), but the fact question remains relevant as a matter of completeness and in establishing a record for appeal.

[15] As noted elsewhere, Defendants use the term "Astellas" and "Plaintiff" to refer to Plaintiff Astellas and its predecessor entities, ACT (a direct predecessor) and SCRMI (a joint venture between ACT and South Korean company, eventually rolled into Astellas).

5. Whether Astellas was aware, or should have reasonably been aware, of sufficient facts concerning Wang, Xu, and ImStem in 2013 and 2014 to give rise to a time bar for Astellas' state-law claims.

6. Whether Astellas has suffered any cognizable harm.

7. Whether ImStem's investors invested in the company for reasons other than because of HB-MSCs.

8. Whether Astellas suffered any actual damages (lost sales, lost revenue, or any other economic harm).

9. Whether Defendants' purported conversion and/or breach of M.G.L. Ch. 93A prior to the publication of Astellas' own '321 patent application (on June 7, 2014) caused any harm to Astellas and, if so, what that harm allegedly is.

IV. JURISDICTIONAL QUESTIONS

Defendants have not raised any jurisdictional challenge.

V. QUESTIONS RAISED BY PENDING MOTIONS

There is only one motion formally pending before the Court: Defendants' Motion to Keep Trial Open to Facilitate Witness Testimony (ECF 211) – Defendants have requested that the Court keep trial open beyond September 25, 2020 to such a time when Defendants' key witnesses can travel to a location where they can provide testimony remotely. Defendants have briefed the issues in the accompanying memorandum of law (ECF 212). Plaintiffs have filed an objection to the request. (ECF 216).

VI. ISSUES OF LAW, INCLUDING EVIDENTIARY ISSUES

A. Procedural Background

Astellas originally brought claims for correction of inventorship of a patent under 35 U.S.C. § 256 (Count I – sole inventorship; Count II – joint inventorship), conversion (Count III),

unjust enrichment (Count IV), unfair trade practices under Massachusetts General Laws Chapter 93A (Count V), misappropriation of trade secrets (Count VI), negligent misrepresentation (Count VII). (ECF 1).[16] Defendants filed counterclaims for correction of inventorship of two different patents under 35 U.S.C. § 256 and unjust enrichment. (ECF No. 91). Approximately two years into the case, Astellas sought leave to add a breach of contract claim (ECF 96), which the Court allowed over Defendants' objection. (*See* ECF 113 (Amended Complaint) at Count VII (breach of contract)).

The parties filed cross-motions for partial summary judgment (ECF 127, 131) and the Court *inter alia* granted partial summary judgment to Plaintiff as to Count II (joint inventorship), determining that Drs. Kimbrel and Lanza should be added to the '551 patent (on which Wang and Xu are already named inventors) based on the facts underlying the joint collaboration.

Shortly before the Final Pretrial Conference, Astellas announced it would no longer pursue its state law claims on misappropriation of trade secrets (Count VI), negligent misrepresentation (Count VII), and breach of contract (Count VIII).

Accordingly, only Count I (correction of inventorship seeking sole inventorship), Count III (conversion), Count IV (unjust enrichment), and Count V (unfair trade practices under M.G.L. c. 93A) of Astellas' state law claims remain for adjudication.

B. Issues of Law

The remaining claims and counterclaims raise several issues of law as set forth in the Defendants' Trial Brief and Proposed Findings of Fact and Conclusions of Law and incorporated

[16] The original Complaint included co-plaintiff Stem Cell & Regenerative Medicine International, Inc. ("SCRMI"). SCRMI was a joint venture between Astellas' predecessor ACT (the relevant entity during the collaboration at issue in this case) and a South Korean company. ACT was eventually acquired by Astellas, which later also acquired co-Plaintiff SCRMI and any/all of its claims in this case.

by reference. For the convenience of the Court (and without waiving the full substance of the proposed Conclusions of Law), the case presents the following issues of law:

1. The Defendants, Drs. Xu and Wang, contributed to the inventions claimed in the '551 Patent and should remain named inventors. *See* Defendant's Trial Memorandum Including Proposed Findings of Fact and Conclusions of Law ("TM") at Proposed Conclusions of Law ¶¶ 100–12.

2. The Defendants, Drs. Xu and Wang, contributed to the inventions claimed in the '321 Patent and should be named inventors. *See* TM at Proposed Conclusions of Law ¶¶ 100–02; 113–19.

3. The Defendants, Drs. Xu and Wang, contributed to the inventions claimed in the '956 Patent and should be named inventors. *See* TM at Proposed Conclusions of Law ¶¶ 100–02; 120–36.

4. The applicable statute of limitations bars the Plaintiff's claim for conversion (Count III). *See* TM at Proposed Conclusions of Law ¶¶ 137–49.

5. Plaintiff's conversion claim also fails on the merits because *inter alia* the Defendants did no exercise dominion of the Plaintiff's technology without right, nor did they deprive the Plaintiff of its use. *See* TM at Proposed Conclusions of Law ¶¶ 150–53.

6. The applicable statute of limitations bars the Plaintiff's claim for unjust enrichment (Count IV). *See* TM at Proposed Conclusions of Law ¶¶ 154–61.

7. Plaintiff's unjust enrichment claim also fails on the merits because *inter alia* neither party has commercialized or received any revenue from the technology at issue. *See* TM at Proposed Conclusions of Law ¶¶ 162–69.

8. The applicable statute of limitations bars the Plaintiff's claim for unfair trade practices (Count V). *See* TM at Proposed Conclusions of Law ¶¶ 170–77.

9. Plaintiff's unfair trade practices claim also fails on the merits because *inter alia* the Defendants did not employ deception, or an unfair act or practice, in patenting the technology at issue. *See* TM at Proposed Conclusions of Law ¶¶ 178–85.

10. Plaintiff's claims for relief conversion (Count III), unjust enrichment (Count IV), and unfair trade practices under Mass. G.L. 93A (Count V) are preempted by Federal patent law. *See* TM at Proposed Conclusions of Law ¶¶ 186–91.

11. The Plaintiff's state law claims are barred by the doctrines of laches and unclean hands. *See* TM at Proposed Conclusions of Law ¶¶ 192–95.

12. The Plaintiff did not suffer any cognizable harm because *inter alia* the Plaintiff's damages are not if the type reasonably expected to follow from the alleged misconduct. *See* TM at Proposed Conclusions of Law ¶¶ 196–99.

13. The Plaintiff's claim for the entire paper value of ImStem (founded on a different technology) is the not the appropriate measure of damages. *See* TM at Proposed Conclusions of Law ¶¶ 196–99.

14. The Defendants' counterclaim for unjust enrichment succeeds because *inter alia* the Plaintiff has unjustly received a benefit of the Defendants. *See* TM at Proposed Conclusions of Law ¶¶ 200–02.

C. Evidentiary Issues

Defendants filed five Motions in Limine (ECF 176, 178, 180, 182, 184) ("MILs"). In the Court's June 9, 2020 Electronic Order (Dkt. 209), the Court denied them as moot with leave to renew at trial. Defendants incorporate the MILs and supporting memoranda of law by reference. For the convenience of the Court (and without waiving their full substance and arguments), the five Defendant MILs are as follows:

1. Motion *in Limine* Regarding U.S. Patent No. 10,557,122 (Dkt. 176 (Motion) and Dkt. 177 (Mem of Law)) on the grounds that such evidence is irrelevant and will cause unnecessary confusion and delay because the parties have stipulated to the outcome of any dispute over the '473 application and the resulting '122 Patent;

2. Motion *in Limine* to Preclude Certain Evidence and Argument Relating to U.S. Patent No. 9,745,551 (Dkt. 178 (Motion) and Dkt. 179 (Mem of Law)) on the grounds that the only relevant issue currently before the Court regarding the '551 patent is whether Defendants' addition of the GSK3 inhibitor step is an "inventive contribution" sufficient to keep Defendants as named inventor of that patent;

3. Motion *in Limine* to Preclude Evidence of Chinese Connections (Dkt. 180 (Motion) and Dkt. 181 (Mem of Law)) pursuant to F. R. Evid. 403 on the grounds that such evidence's highly prejudicial nature outweighs its negligible, if any probative value;

4. Motion *in Limine* to Preclude Improper Expert Testimony Regarding State Law Claims (Dkt. 182 (Motion) and Dkt. 183 (Mem of Law)) on the grounds that Dr. Lisa Fortier's opinions beyond inventive contribution invade the province of the Court on the law and as the fact finder, and that they are beyond her expertise; and,

5. Motion *in Limine* to Preclude Improper Testimony Regarding Collaboration and Inventive Contribution (Dkt. 184 (Motion) and Dkt. 185 (Mem of Law) on the grounds that any testimony of Drs. Fortier and Brivanlou regarding facts that vouch for fact witnesses or render verdicts as to which party contributed certain concepts/elements to the patents-in-suit are beyond the proper testimony of a scientist expert.

VII. REQUESTED AMENDMENTS TO THE PLEADINGS

The Defendants do not request an amendment of the pleadings at this time but request leave to move to amend the pleadings to conform to the evidence, if appropriate, during or at the conclusion of trial. Fed.R.Civ.P 15(b).

VIII. ADDITIONAL MATTERS TO AID IN THE DISPOSITION OF THE CASE

A. The Parties' Stipulations Regarding Trial Proceedings

The parties have discussed and, subject to the Court's agreement, stipulate to the following trial procedures, with the goal of enabling efficiency and flexibility for the trial, including by having witnesses who otherwise would have been called to testify multiple times, only do so once:

(1) Plaintiff will address all issues, including Defendants' counterclaims, it its case-in-chief, and Defendants will address all their issues, including their defenses to Plaintiffs' claims, in their case-in-chief;

(2) The order of presentation of evidence will have no effect on the Parties' respective burdens of proof—each Party will still bear the burden on its/their asserted claims;

(3) The Parties will postpone all motions for judgment as a matter of law (JMOL) until the close of evidence; and

(4) The Parties agree that cross-examination of fact witnesses will not be limited to the scope of the direct, in order to enable each fact witness to only have to testify once (for example, rather than Plaintiff calling Dr. Wang as an adverse witness in its case-in-chief, Defendants will call Dr. Wang in their case-in-chief, and then Plaintiff may cross on both Parties' issues).

At this time, the Parties believe that neither side will need a rebuttal, however, the Parties reserve their rights to address this as trial progresses.

B. Advance Exchange of Demonstratives

Defendants propose that each side disclose any demonstratives they intend to use to the other side by noon the day before the witness is scheduled to testify, and that they further agree meet and confer (if necessary) by close of business that day.

Defendants are aware that Plaintiff may propose a substantially more choreographed process (*e.g*. three days before a witness is scheduled to testify, the offering party will disclose to the other side a list of the exhibits they intend to use; the next day the other party will identify objections it intends to assert; the parties will meet and confer; etc.). Plaintiff's proposal is out of step with ordinary trial practice, the vicissitudes of normal trial, and imposes additional deadlines and process steps that Defendants' cannot reasonably financially bear. Trial is already a pronounced financial burden on the Defendants. Further, Defendants note that they have been far less prolific in their objections to date and intend to waive many or most of them at trial, as is commonly done in the ordinary course. Most issues have already been raised in the MILs and can be addressed quickly, on the spot, with reference to prior briefing.

C. Handling of Exhibits During Examinations

Defendants understand the Court has used the web-based Zoom for Government platform. *See generally* https://www.zoomgov.com/. Counsel have sought to contact the Court's IT department to confirm the capabilities of the Court's system and are awaiting a response. Unless the Court's ZoomGov account has some restrictions with which we are not familiar, Defendants propose what has now become rather standard practice: Sharing exhibits in real time via the "chat" function. All but a handful of the parties' exhibits are under 50 MB; most will load instantly and even the largest are easily navigated. In the event exhibits or demonstratives are to be marked in real time, examining counsel can share his or her screen.

D. Time Zone Accommodation

Due to the global COVID-19 pandemic the parties have agreed to proceed with a bench trial to be conducted remotely *(i.e*. by video). A remote trial presents a number of advantages in terms of accommodating witness health and safety concerns, travel and quarantine restrictions, Court restrictions, and other logistical and legal impediments created by the pandemic. It also,

however, raises a few logistical issues

Drs. Bunnell and Perry will be testifying from home/office locations in Texas and Missouri, respectively, in time zones separated from the Court by two hours. Defendants request that they be shifted to a late morning (*e.g.* 10:30 am EST) schedule.

Drs. Xu and Men will in all likelihood be testifying from Hong Kong – as soon as they are able (*see* ECF 211) – at which point they will be operating in a time zone separated from the Court by twelve hours. Both are prepared to go to extraordinary lengths to accommodate the Court's schedule, but an early-morning start (*e.g.* 7:30 am EST) would minimize any prejudice from them being tired at night their time.

IX. WITNESSES AND PROBABLE LENGTH OF TRIAL

The parties have conferred and now endeavor to give the Court good-faith estimates of the number of hours of testimony required for each witness – essentially as s proxy for the length of trial, since the overall length will be determined by the Court's availability (e.g. half-day v. full-day) and any other limitations indirectly imposed by the pandemic.

Defendants expect to examine and/or cross-examine the following witnesses during Plaintiffs' case-in-chief:

No.	Name	Subjects	Expected Hours[17]
TBD[18]	Robert Lanza, Ph.D. c/o Latham & Watkins, LLP 555 Eleventh Street NW Washington, DC 20004 (202) 637-2200	Inventive contribution to the patents-in-suit; circumstances surrounding the parties' collaboration and attendant facts; Plaintiffs' state law claims.	2
TBD	Erin Kimbrel, Ph.D. Sudbury, MA	Inventive contribution to the patents-in-suit; circumstances surrounding the parties'	2

[17] *I.e.* the amount of time Defendants will require on top of any examination by Astellas. Further, these estimates have been built in consideration of the uncertainties of remote/Zoom trial.

[18] Astellas will determine the order and timing of its witnesses.

	c/o Latham & Watkins, LLP 555 Eleventh Street NW Washington, DC 20004 (202) 637-2200	collaboration and attendant facts; Plaintiffs' state law claims.	
TBD	Dr. Ali Brivanlou c/o Latham & Watkins, LLP 555 Eleventh Street NW Washington, DC 20004 (202) 637-2200	Expert testimony concerning inventive contributions to the patents-in-suit.	1.5
TBD	Dr. Lisa Fortier c/o Latham & Watkins, LLP 555 Eleventh Street NW Washington, DC 20004 (202) 637-2200	Expert testimony concerning inventive contributions to the patents-in-suit.	3
TBD	Dr. Gregory Bell c/o Latham & Watkins, LLP 555 Eleventh Street NW Washington, DC 20004 (202) 637-2200	Expert testimony concerning Plaintiffs' damages claims.	3

Defendants expect to examine the following witnesses during their own case-in-chief:

No.	Name	Subjects	Expected Hours
1	Dr. Xiaofang Wang, M.D. Ph.D. Vice President and Chief Technology Officer ImStem Biotechnology, Inc. 400 Farmington Ave. R1808 Farmington, CT 06032 (860) 679-2245 (o)	Inventive contribution to the patents-in-suit; circumstances surrounding the parties' collaboration and attendant facts; rebuttal of Plaintiffs' state law claims.	10
2	Bryan Zerhusen, Ph.D., Esq. Cantor Colburn LLP 20 Church Street, 22nd Floor Hartford, CT 06103-3207	Expert testimony regarding patent prosecution and history of the patents-in-suit.	2.5
3	Dr. Nicholas Arthur Kouris Hudson, MA c/o Latham & Watkins, LLP 555 Eleventh Street NW Washington, DC 20004 (202) 637-2200	Inventive contribution to the patents-in-suit; circumstances surrounding the parties' collaboration and attendant facts; Plaintiffs' state law claims.	1

4	Dr. Bruce Bunnell University of North Texas School of Biomedical Sciences 3500 Camp Bowie Blvd. Fort Worth, TX (817) 735-2789	Expert testimony regarding inventive contribution to the patents-in-suit and significance of the inventive contribution.	5
5	John M. Perry, Ph.D. Children's Mercy Kansas City 2401Gillham Road Kansas City, MO 64108	Expert testimony regarding inventive contribution to the patents-in-suit and significance of the inventive contribution.	3
6	Philip Green, CPA, ABV, ASA Hoffman Alvary & Company LLC, Seven Wells Avenue, Newton, Massachusetts 02459	Expert testimony in rebuttal to Plaintiffs' damages claims.	4
TBD[19]	Dr. Ren-He Xu Associate Dean (Research) Faculty of Health Sciences University of Macau, E12 Avenida da Universidade, Taipa, Macau, China (+853) 8822 4939	Inventive contribution to the patents-in-suit; circumstances surrounding the parties' collaboration and attendant facts; rebuttal of Plaintiffs' state law claims.	6
TBD	Dr. Michael Men ZhuHai Hengquin Imstem Biotech Ltd., Henquin New District Hunandao Donglu 1889, Hengquin Chuangyigu Building 3, Ahuhai, GuangDong 519031 China	The circumstances surrounding the foundation of Defendant, ImStem and attendant facts; the research and marketing focuses of Defendant, ImStem and attendant facts; rebuttal to Plaintiffs' damages claims and Plaintiffs' state law claims.	1.5

Defendants expect to play and/or read the following deposition designations. Subject to further changes in the schedule and feedback from the Court and in the interest of speeding the process, Defendants propose that the Lu testimony be played in court and the other witness depositions be submitted in written form to the Court for review.

[19] The dates of Drs. Xu and Men's participation is still uncertain in light of ongoing travel restrictions. *See generally* Defendants' Motion to Keep Trial Open to Facilitate Witness Testimony (ECF 211).

No.	Name	Subjects	Expected Hours
1	Dr. Jianlin Chu (July 2, 2019 deposition)	Inventive contribution to the patents-in-suit and the circumstances surrounding the parties' collaboration and attendant facts.	n/a
2	Dr. Shi-Jiang Lu (July 26, 2019 deposition)	The circumstances surrounding the genesis of the parties' collaboration and attendant facts; inventive contribution to the patents-in-suit.	2
3	Susie Cheng (June 10, 2019 deposition)	Prosecution history of the patents-in-suit and attendant facts.	n/a

X. PROPOSED EXHIBITS

Attached as Exhibit B is a table ("Numbered Exhibits With No Objections") setting forth the proposed stipulated exhibits, numbered per the Court's prior orders. Attached as Exhibit C is a table ("Lettered Exhibits with Objections") setting forth the proposed objected-to exhibits, lettered per the Court's prior orders. We note that the parties have agreed to use a single, common exhibit where the parties had previously marked multiple duplicates or near-duplicates in the course of discovery.

Dated: August 10, 2020

IMSTEM BIOTECHNOLOGY, INC.;
DR. XIAOFANG WANG; and
DR. REN-HE XU

By their Attorneys,

/s/ *Timothy Shannon*

Timothy R. Shannon, MA Bar # 655325
Martha C. Gaythwaite, MA Bar # 187650
VERRILL DANA LLP
One Portland Square
Portland, Maine 04101
(207) 774-4000
tshannon@verrill-law.com
mgaythwaite@verrill-law.com

Benjamin M. Stern, MA Bar # 646778
VERRILL DANA LLP
One Federal Street, 20th Floor
Boston, Massachusetts 02110
(617) 309-2600
bstern@verrill-law.com

Attorneys for Defendants

CERTIFICATE OF SERVICE

I hereby certify that on August 10, 2020, I caused a true copy of the foregoing document to be served upon all counsel of record via the Court's CM/ECF electronic filing system.

Charles H. Sanders (via email; Charles.Sanders@lw.com)
LATHAM & WATKINS LLP
John Hancock Tower, 27th Floor
200 Clarendon Street
Boston, MA 02116

David P. Frazier (via email; David.Frazier@lw.com)
Rebecca L. Rabenstein (via email; Rebecca.Rabenstein@lw.com)
LATHAM & WATKINS LLP
555 Eleventh Street, N.W., Ste. 1000
Washington, DC 20004

Counsel for Plaintiffs

/s/ *Timothy R. Shannon*
Timothy R. Shannon